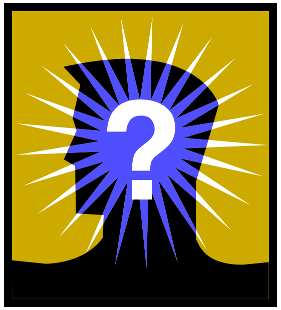
Latest Developments in Emergency Alert Systems (EAS)

DeWayne Sennett (KE7DXW)

Communications Academy

April 1, 2006

Who Am I?



- **DeWayne Sennett**
  KE7DXW

- Professional Experience
  - Cingular Wireless
    - International Standardization for 3G Wireless Systems & Beyond
    - Current Project Activities Include Emergency Alert Services

- Volunteer Experience
  - Leader of Redmond ARES Planning & Training Group
  - Board Member on Redmond Citizen Corps Council (RCCC) Representing Redmond ARES Group
  - Member of Western Washington Medical Services Communications Team
  - President of the Trilogy Emergency Preparedness Education (TEPE) Club
  - Certified as CERT Trainer
  - Past Board Member & Treasurer of Sammamish Citizen Corps Council

Agenda

- What is EAS Today?
- Washington State EAS Plan
- National Weather Radio (NWR)
- Why Does EAS Need To Change?
- Regulatory & Legislative Activities
- Mobile Communication Challenges for EAS Support
- Where is EAS Going?
- Impact to Amateur Radio

What is EAS Today?

Emergency Alert System -- EAS

- Current EAS System
  - Evolved from Earlier Emergency Broadcast System (EBS) & Original "CONELRAD System" developed during WWII
- EAS relies on radio & TV broadcast stations to relay emergency alert messages from federal, state, & local authorities
- Messages may pertain to any immediate threat to public safety
  - Includes enemy attack, storm warnings, earthquake alerts, tsunami warnings, wildfires, AMBER alerts, and terrorism
- Messages are relayed from station to station using automatic switching systems and digital signaling

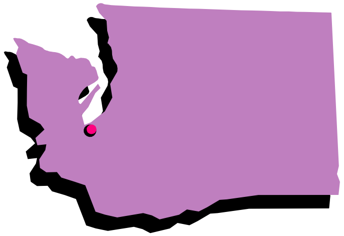
State of Washington EAS Plan

- Broadcasters Not Expected to Originate Messages → Just Relay Them to Public
  - Authorized government agencies originate all EAS messages at both State and Local levels

- EAS Messages Pass Through Broadcast Network in Background & Stay in Background As Much As Possible.
  - What is called a daisy chain of broadcast stations is avoided except for backup/alternate routing

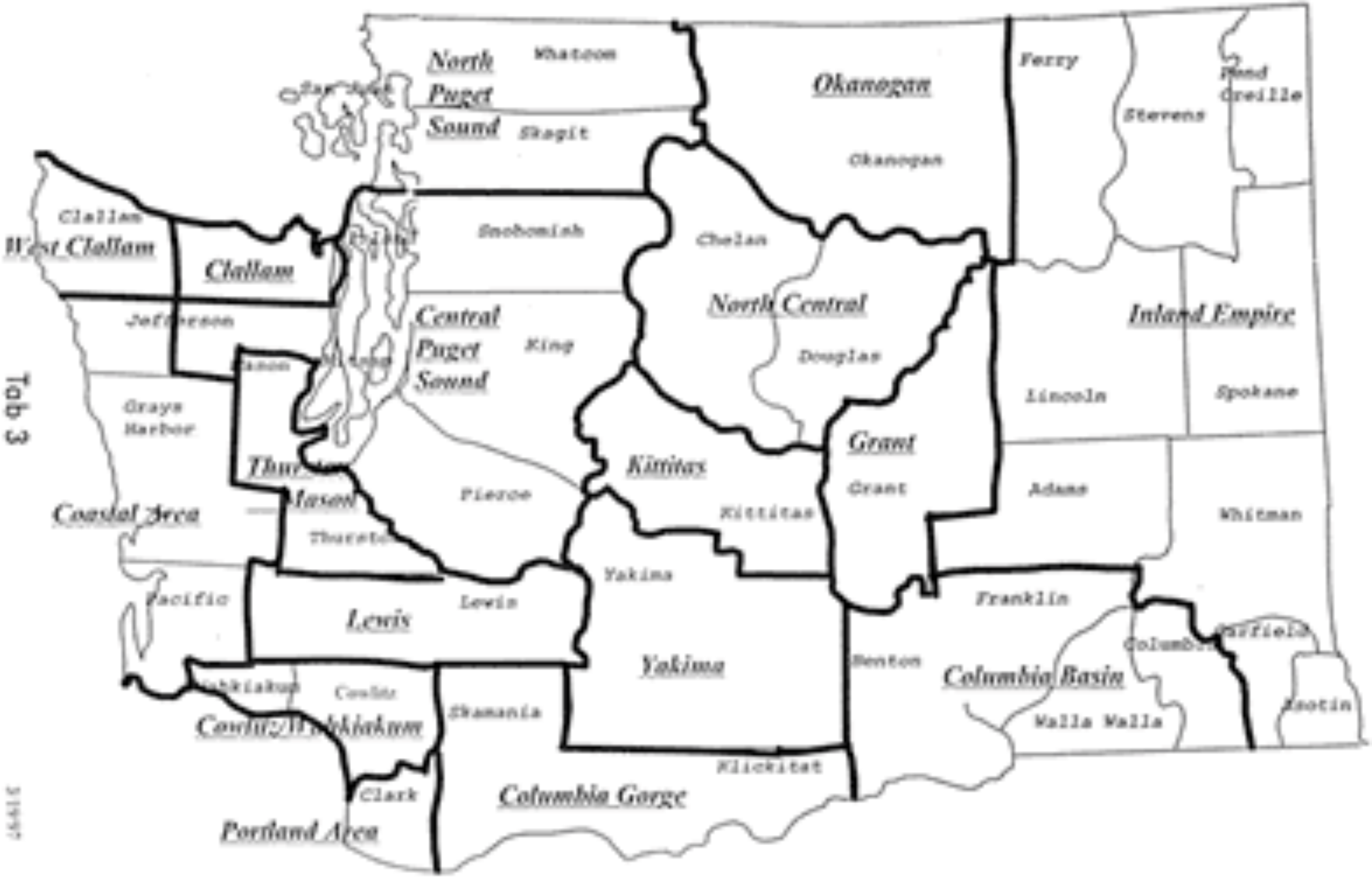
- NOAA/NWS Fully Integrated Into System
  - Event's that were not originated by NWS are still routed through their transmitters

Washington EAS System



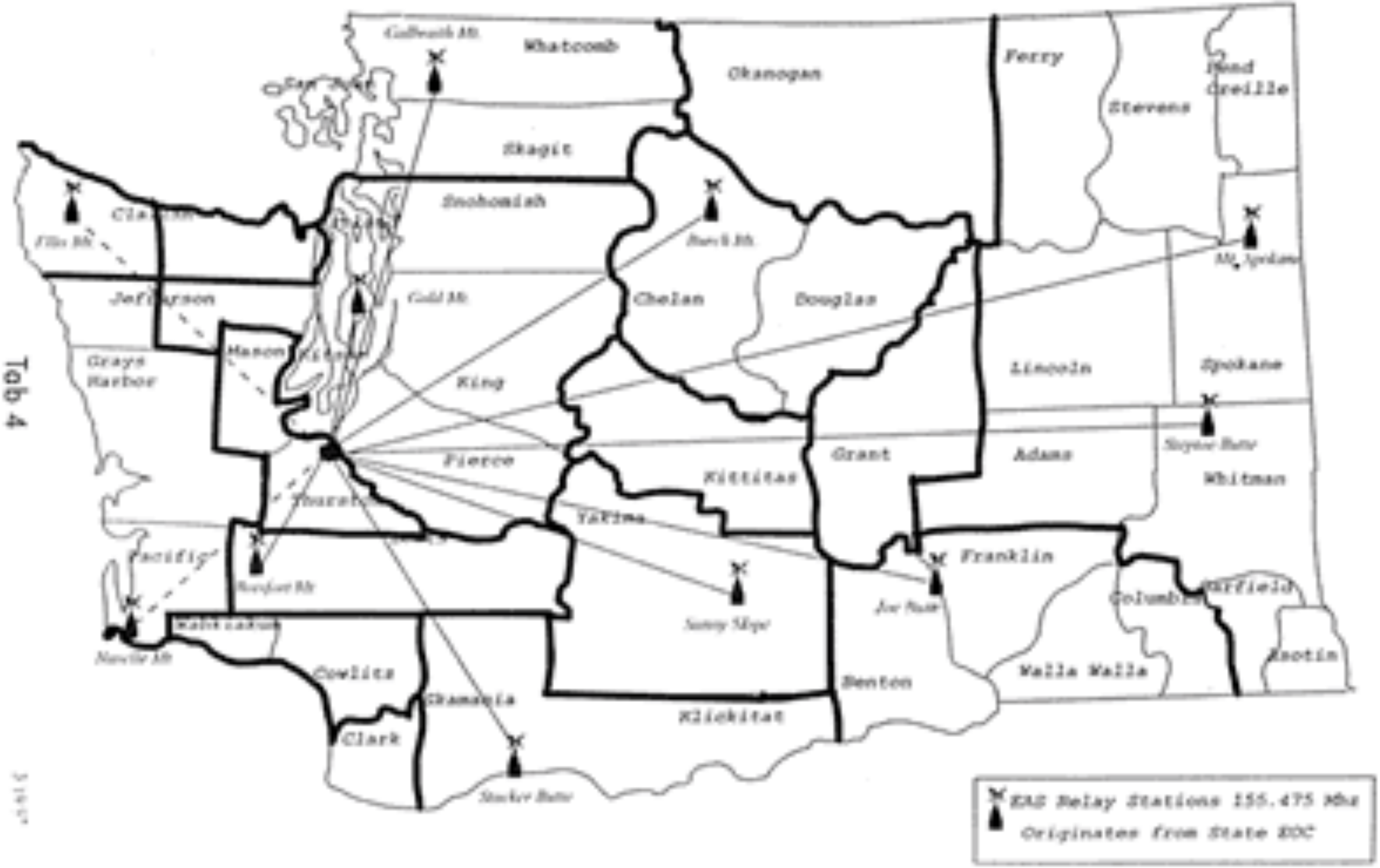
- VHF Relay Network
  - Utilizes a Washington State Patrol Frequency
  - Controlled from Washington State Department of Emergency Services building at Camp Murray, WA
- Network Gives Full State Coverage
- Decoder/Encoder Installed at WSDEM Not Only Can Initiate EAS messages → Can Also Receive & Relay Them
- Decoders/Encoders Installed At All NWS Offices Through Out WA State

Washington State EAS Operation Areas



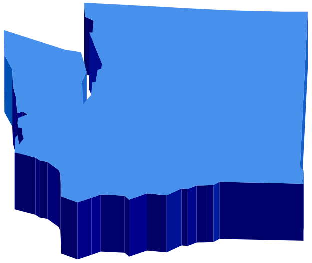
Tab 3

Washington State EAS Relay Network



Tab 4

2006 Washington Required EAS Tests



DATE	DAY	TIME	ORIGINATOR
Jan. 5	Thursday	2:50 p.m.	Local Area
Feb. 8	Wednesday	7:25 a.m.	State DEM
Mar. 7	Tuesday	7:50 a.m.	Local Area
Apr. 6	Thursday	9:45 a.m.	State DEM
May 2	Tuesday	10:00 a.m.	Local Area
June 5	Monday	7:50 a.m.	Local Area
July 8	Saturday	9:50 a.m.	State DEM
Aug. 6	Sunday	7:50 a.m.	Local Area
Sept. 13	Wednesday	10:45 a.m.	National Weather Service
Oct. 6	Friday	11:30 p.m.	Local Area
Nov. 9	Thursday	10:25 a.m.	Local Area
Dec. 6	Wednesday	7:50 a.m.	Local Area

Washington EAS Info

- Washington EAS Info & FAQ website
  - http://www.eas-wa.info/
- Washington AMBER Alert website
  - http://www.amberalert911.com/?SelState=WA
- Washington EAS plan
  - http://www.eas-wa.info/wseas.htm

NOAA Weather Alert & National Weather Radio (NWR)

- NWR → All-Hazards Public Warning System
  - Broadcasting forecasts, warnings and emergency information 24 hours a day 7 days a week directly to the public
- NWR Uses Seven Frequencies in 162 MHz Band
- Specific Area Message Encoding (SAME)
  - Remain silent until an alert is received for a specific geographic area

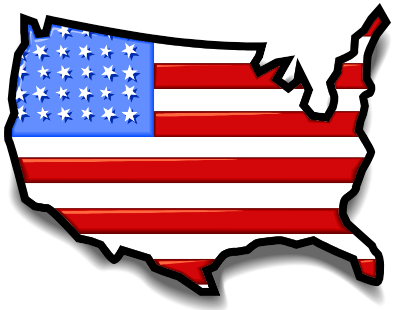
What Are All Hazards?

- All Hazards Emergency Messages Include
  - Natural Hazards
    - Tornadoes
    - Hurricanes
    - Volcanoes
    - Floods
    - Earthquakes
  - Technological Accidents
    - Chemical Releases
    - Oil Spills
    - Nuclear Power Plant Emergencies
  - Terrorism
  - AMBER Alerts
  - Other Alerts

NWR & EAS

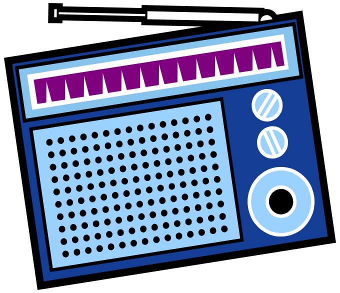
- NWR & EAS Use Same Digital Protocols
- NWR is Primary Means for NWS Alerts to Activate the EAS
- Criteria to Disseminate Non-Weather Related Civil Emergency Messages
  - Public Safety is Involved
  - Message Originates From Official Government Source
  - Information is Time Critical

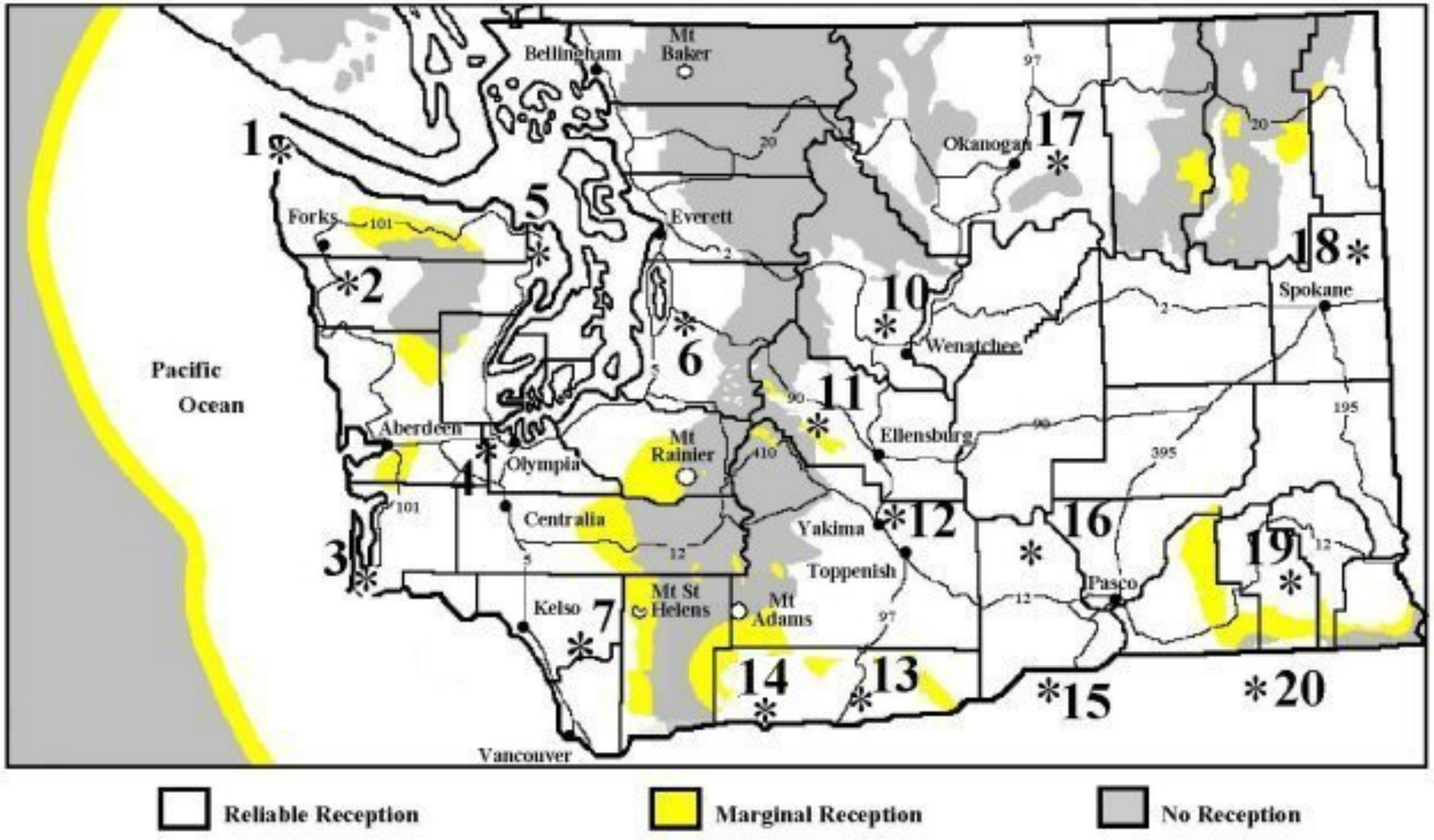
National Weather Radio Coverage



- Over 900 NOAA Weather Radio stations across the U.S.
    - Covers 97% of Nation
- Twenty-one Stations Broadcast in Washington State

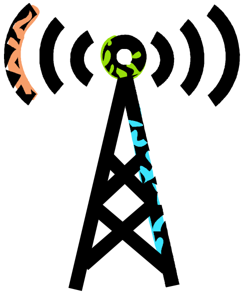
NWR Coverage in Washington





NWR Transmitter Sites

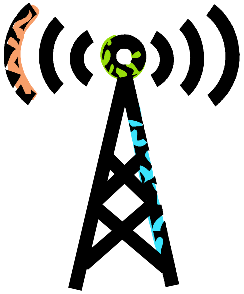
(1 of 4)



No.	ST.	COUNTY	SAME #	NWR TRANSMITTER	FREQ MHz	CALL	WATTS
16	WA	Adams	53001	Richland, WA	162.45	WWF56	100
*	WA	Asotin	53003	Lewiston, ID	162.55	WXK98	100
16	WA	Benton	53005	Richland, WA	162.45	WWF56	100
15	WA	Benton	53005	Umatilla, OR	162.5	WWF57	330
17	WA	Chelan	53007	Okanogan, WA	162.525	WWF49	50
10	WA	Chelan	53007	Wenatchee, WA	162.475	WXM48	100
5	WA	Clallam	53009	Puget Sound Marine, WA	162.425	WWG24	100
1	WA	Clallam	53009	Neah Bay, WA	162.55	KIH36	330
2	WA	Clallam	53009	Forks, WA	162.425	KXI27	300
*	WA	Clark	53011	Portland, OR	162.55	KIG98	330
7	WA	Clark	53011	Woodland, WA	162.525	WNG604	300
19	WA	Columbia	53013	Dayton, WA	162.525	KZZ73	300
*	WA	Cowlitz	53015	Portland, OR	162.55	KIG98	330
7	WA	Cowlitz	53011	Woodland, WA	162.525	WNG604	300
4	WA	Cowlitz	53015	Olympia, WA	162.475	WXM62	100
10	WA	Douglas	53017	Wenatchee, WA	162.475	WXM48	100
17	WA	Douglas	53017	Okanogan, WA	162.525	WWF49	50
* - Additional sites not shown on map							

NWR Transmitter Sites

(2 of 4)

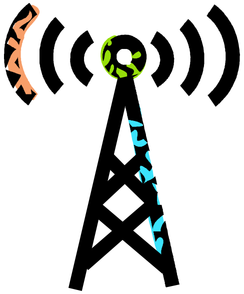


No.	ST.	COUNTY	SAME #	NWR TRANSMITTER	FREQ MHz	CALL	WATTS
17	WA	Ferry	53019	Okanogan, WA	162.525	WWF49	50
16	WA	Franklin	53021	Richland, WA	162.45	WWF56	100
*	WA	Garfield	53023	Lewiston, ID	162.55	WXK98	100
19	WA	Garfield	53023	Dayton, WA	162.525	KZZ73	300
17	WA	Grant	53025	Okanogan, WA	162.525	WWF49	50
10	WA	Grant	53025	Wenatchee, WA	162.475	WXM48	100
16	WA	Grant	53025	Richland, WA	162.45	WWF56	100
4	WA	Grays Harbor	53027	Olympia, WA	162.475	WXM62	100
3	WA	Grays Harbor	53027	Astoria, OR	162.4	KEC91	100
2	WA	Grays Harbor	53027	Forks, WA	162.425	KXI27	300
5	WA	Island	53029	Puget Sound Marine, WA	162.425	WWG24	100
1	WA	Jefferson	53031	Neah Bay, WA	162.55	KIH36	330
6	WA	Jefferson	53031	Seattle, WA	162.55	KHB60	330
5	WA	Jefferson	53031	Puget Sound Marine, WA	162.425	WWG24	100
2	WA	Jefferson	53031	Forks, WA	162.425	KXI27	300
5	WA	King	53033	Puget Sound Marine, WA	162.425	WWG24	100
6	WA	King	53033	Seattle, WA	162.55	KHB60	330

* - Additional sites not shown on map

NWR Transmitter Sites

(3 of 4)

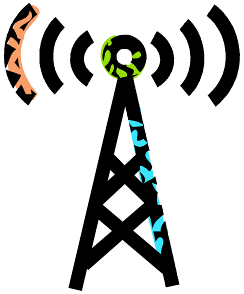


No.	ST.	COUNTY	SAME #	NWR TRANSMITTER	FREQ MHz	CALL	WATTS
5	WA	Kitsap	53035	Puget Sound Marine, WA	162.425	WWG24	100
12	WA	Kittitas	53037	Yakima, WA	162.55	KIG75	300
10	WA	Kittitas	53037	Wenatchee, WA	162.475	WXM48	100
11	WA	Kittitas	53037	Cle Elum, WA - primary	162.4	WXN21	75
16	WA	Klickitat	53039	Richland, WA	162.45	WWF56	100
14	WA	Klickitat	53039	The Dalles, OR	162.4	WXM34	330
13	WA	Klickitat	53039	Goldendale, WA	162.525	WNG566	100
4	WA	Lewis	53041	Olympia, WA	162.475	WXM62	100
18	WA	Lincoln	53043	Spokane, WA	162.4	WXL86	100
17	WA	Lincoln	53043	Okanogan, WA	162.525	WWF49	50
4	WA	Mason	53045	Olympia, WA	162.475	WXM62	100
17	WA	Okanogan	53047	Okanogan, WA	162.525	WWF49	50
3	WA	Pacific	53049	Astoria, OR	162.4	KEC91	100
4	WA	Pacific	53049	Olympia, WA	162.475	WXM62	100
2	WA	Pacific	53049	Forks, WA	162.425	KXI27	300
18	WA	Pend Oreille	53051	Spokane, WA	162.4	WXL86	100
*	WA	Pend Oreille	53051	Bonners Ferry, ID	162.5	WWG99	100

* - Additional sites not shown on map

NWR Transmitter Sites

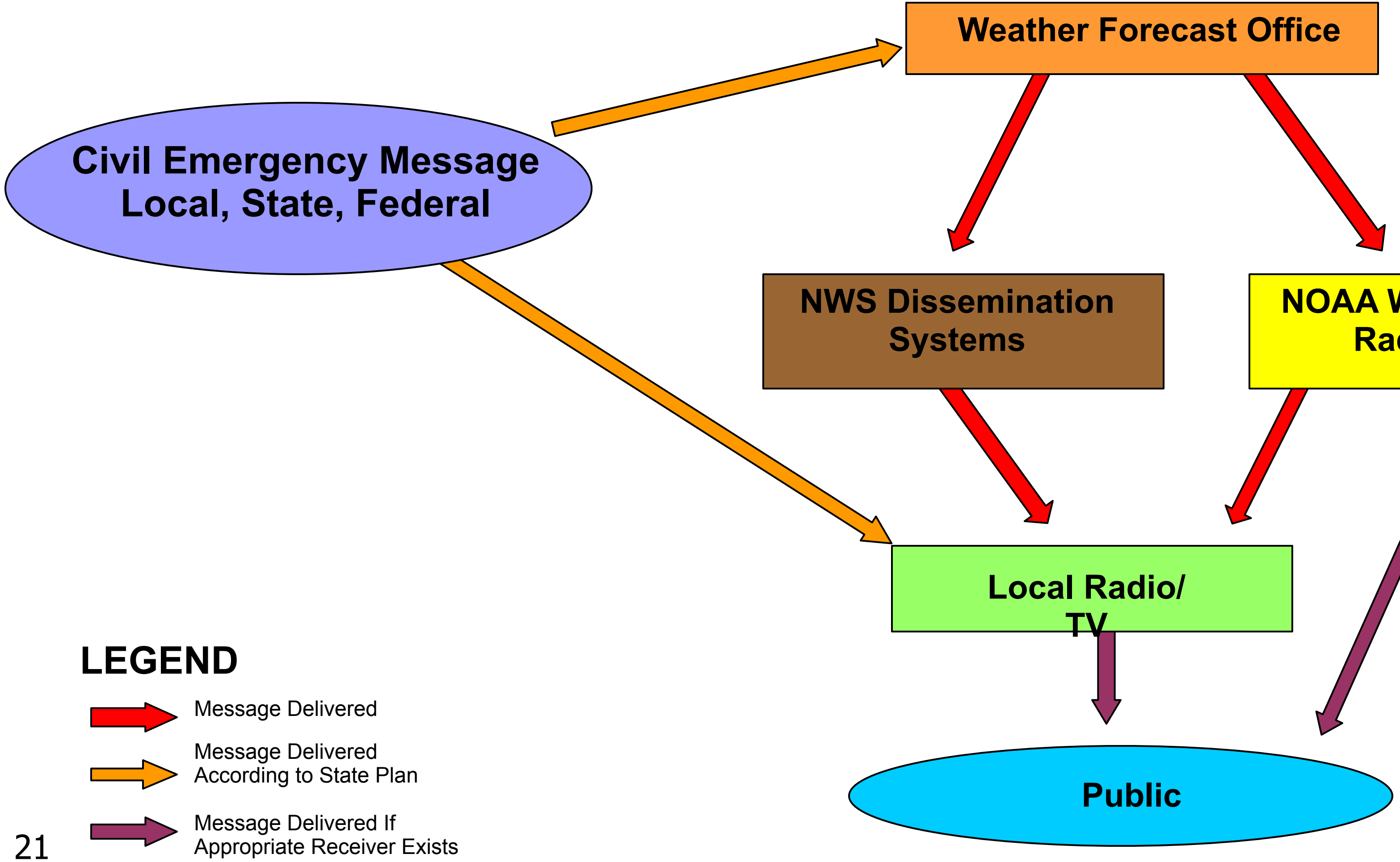
(4 of 4)



No.	ST.	COUNTY	SAME #	NWR TRANSMITTER	FREQ MHz	CALL	WATTS
4	WA	Pierce	53053	Olympia, WA	162.475	WXM62	100
5	WA	Pierce	53053	Puget Sound Marine, WA	162.425	WWG24	100
6	WA	Pierce	53053	Seattle, WA	162.55	KHB60	330
5	WA	San Juan	53055	Puget Sound Marine, WA	162.425	WWG24	100
5	WA	Skagit	53057	Puget Sound Marine, WA	162.425	WWG24	100
*	WA	Skamania	53059	Portland, OR	162.55	KIG98	330
14	WA	Skamania	53059	The Dalles, OR	162.4	WXM34	330
5	WA	Snohomish	53061	Puget Sound Marine, WA	162.425	WWG24	100
6	WA	Snohomish	53061	Seattle, WA	162.55	KHB60	330
18	WA	Spokane	53063	Spokane, WA	162.4	WXL86	100
*	WA	Spokane	53063	Bonners Ferry	162.5	WWG99	100
18	WA	Stevens	53065	Spokane, WA	162.4	WXL86	100
4	WA	Thurston	53067	Olympia, WA	162.475	WXM62	100
3	WA	Wahkiakum	53069	Astoria, OR	162.4	KEC91	100
20	WA	Walla Walla	53071	Pendleton, OR	162.4	WXL95	330
16	WA	Walla Walla	53071	Richland, WA	162.45	WWF56	100
5	WA	Whatcom	53073	Puget Sound Marine, WA	162.425	WWG24	100
*	WA	Whitman	53075	Lewiston, ID	162.55	WXK98	100
12	WA	Yakima	53077	Yakima, WA	162.55	KIG75	300
16	WA	Yakima	53077	Richland, WA	162.45	WWF56	100

* - Additional sites not shown on map

How Emergency Messages Reach Public Today



Weather Forecast Office

Civil Emergency Message
Local, State, Federal

NWS Dissemination Systems

NOAA Weather Radio

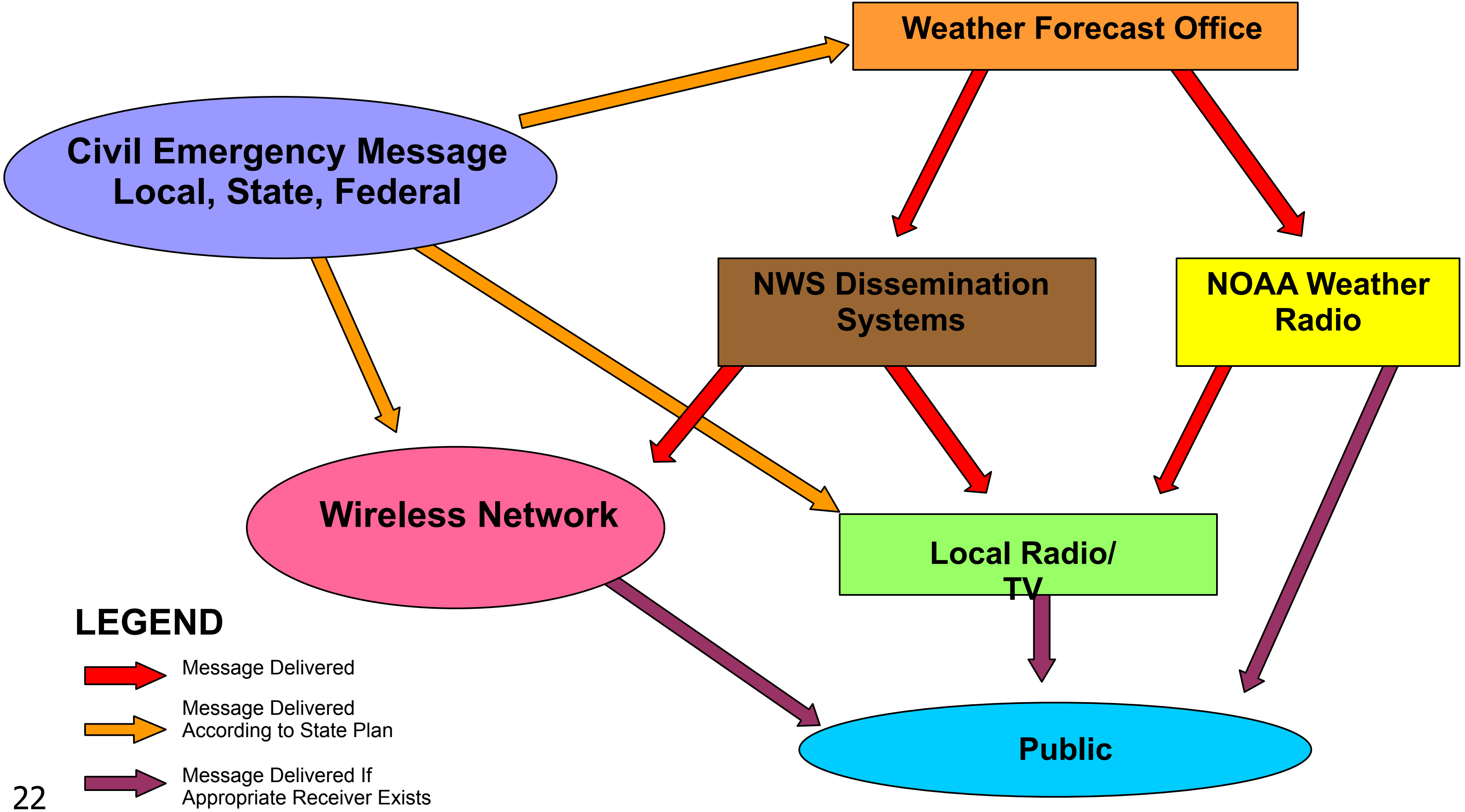
Local Radio/ TV

Public

LEGEND

- ➡ Message Delivered
- ➡ Message Delivered According to State Plan
- ➡ Message Delivered If Appropriate Receiver Exists

How Emergency Messages Could Reach Public In Future



Weather Forecast Office

Civil Emergency Message
Local, State, Federal

NWS Dissemination Systems

NOAA Weather Radio

Wireless Network

Local Radio/ TV

Public

LEGEND

- 🟥 Message Delivered
- 🟧 Message Delivered According to State Plan
- 🟪 Message Delivered If Appropriate Receiver Exists

Why Does EAS Need To Change?

- Warnings Do Not Reach Many People At Risk

- Existing Systems Fragmented & Do Not Take Advantage of New Technologies

- Need More Immediate Communication to Citizens
  - Tsunamis, Volcanic Activity, Earthquakes
  - Weather Conditions
  - Chemical Spills & Toxic Gas Clouds
  - Terrorism Acts

- Maximize Communication Channels & Methods
  - Proliferation of Mobile Devices
  - Widespread Usage of Internet Access
  - Digital Broadcast Capabilities

- Supplement Existing Alerting by Radio & TV Broadcasts

Congressional Activities

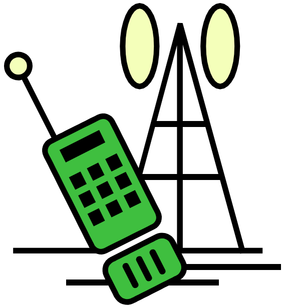
- U.S. Senate
  - Senate Bill SR-1753
  - Warning, Alert and Response Network (WARN) Act
  - Pending on US. Senate Floor

- U.S. House of Representatives
  - H.R. 2101
  - Proposed Amendment To Homeland Security Act of 2002
  - Responsive Emergency Alert and Dissemination of Information Call System or READICall System Act
  - Remanded to U.S. House Subcommittee on Emergency Preparedness, Science, and Technology

Current FCC Activities

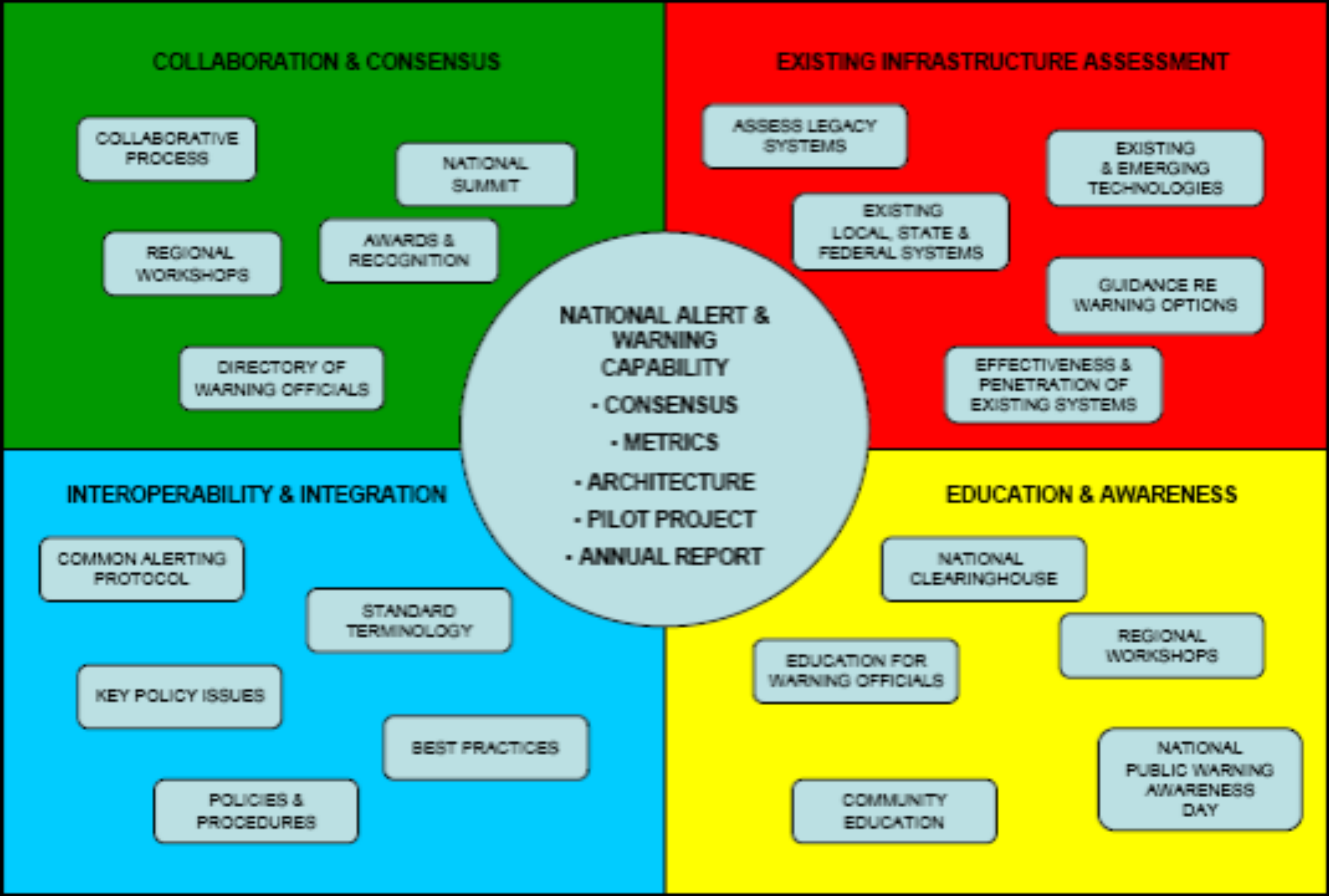
- First Report and Order – November 5, 2005
  - Expands Current FCC EAS Rules
  - Requires EAS support by digital broadcast and cable TV, digital audio broadcasting, & satellite radio by December 31, 2006
  - Requires EAS support by direct broadcast satellite services by May 31, 2007
- Further Notice of Proposed Rulemaking – November 5, 2005
  - Seeks comment on how to best help develop a next-generation alert and warning system that takes full advantage of digital media's potential.
    - Type of system architecture
    - Common protocols
  - Effective integration of wireless technologies into next generation alert and warning system
  - EAS support by traditional telephone companies using high definition digital content to customers' homes through fiber optic connections
- New FCC Public Safety & Homeland Security Bureau Created March 17, 2006
  - EAS Moved to New Bureau

Industry Activities



- Interactions with Congress and Congressional Subcommittees
- Comments to FCC Future Notice of Proposed Rulemaking
- Investigation efforts
  - 3G Americas
  - Cellular Telecommunication Industry Association (CTIA)
  - GSM Association North America Regional Interest Group (GSM-NA)

CREATING A NATIONAL ALL-HAZARD WARNING CAPABILITY: FORGING A NATIONAL CONSENSUS



COLLABORATION & CONSENSUS

- COLLABORATIVE PROCESS
- NATIONAL SUMMIT
- REGIONAL WORKSHOPS
- AWARDS & RECOGNITION
- DIRECTORY OF WARNING OFFICIALS

EXISTING INFRASTRUCTURE ASSESSMENT

- ASSESS LEGACY SYSTEMS
- EXISTING & EMERGING TECHNOLOGIES
- EXISTING LOCAL, STATE & FEDERAL SYSTEMS
- GUIDANCE RE WARNING OPTIONS
- EFFECTIVENESS & PENETRATION OF EXISTING SYSTEMS

NATIONAL ALERT & WARNING CAPABILITY

- CONSENSUS
- METRICS
- ARCHITECTURE
- PILOT PROJECT
- ANNUAL REPORT

INTEROPERABILITY & INTEGRATION

- COMMON ALERTING PROTOCOL
- STANDARD TERMINOLOGY
- KEY POLICY ISSUES
- BEST PRACTICES
- POLICIES & PROCEDURES

EDUCATION & AWARENESS

- NATIONAL CLEARINGHOUSE
- REGIONAL WORKSHOPS
- EDUCATION FOR WARNING OFFICIALS
- COMMUNITY EDUCATION
- NATIONAL PUBLIC WARNING AWARENESS DAY

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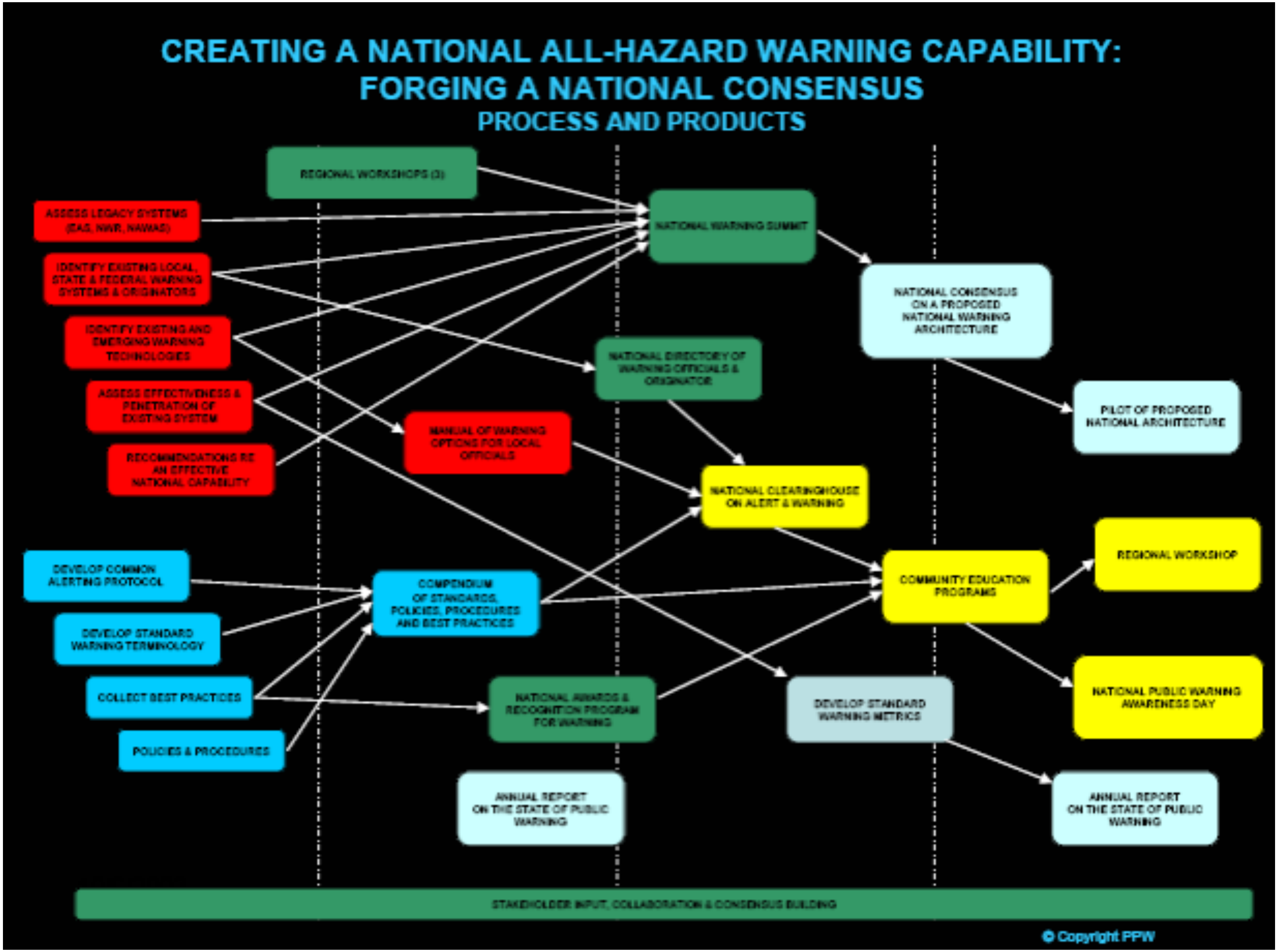

CREATING A NATIONAL ALL-HAZARD WARNING CAPABILITY: FORGING A NATIONAL CONSENSUS

PROCESS AND PRODUCTS

REGIONAL WORKSHOPS (3)

ASSESS LEGACY SYSTEMS (EAS, NWR, NAWAS)

IDENTIFY EXISTING LOCAL, STATE & FEDERAL WARNING SYSTEMS & ORIGINATORS

IDENTIFY EXISTING AND EMERGING WARNING TECHNOLOGIES

ASSESS EFFECTIVENESS & PENETRATION OF EXISTING SYSTEM

RECOMMENDATIONS RE AN EFFECTIVE NATIONAL CAPABILITY

DEVELOP COMMON ALERTING PROTOCOL

DEVELOP STANDARD WARNING TERMINOLOGY

COLLECT BEST PRACTICES

POLICIES & PROCEDURES

MANUAL OF WARNING OPTIONS FOR LOCAL OFFICIALS

COMPENDIUM OF STANDARDS, POLICIES, PROCEDURES AND BEST PRACTICES

NATIONAL AWARDS & RECOGNITION PROGRAM FOR WARNING

ANNUAL REPORT ON THE STATE OF PUBLIC WARNING

NATIONAL WARNING SUMMIT

NATIONAL DIRECTORY OF WARNING OFFICIALS & ORIGINATOR

NATIONAL CLEARINGHOUSE ON ALERT & WARNING

DEVELOP STANDARD WARNING METRICS

NATIONAL CONSENSUS ON A PROPOSED NATIONAL WARNING ARCHITECTURE

COMMUNITY EDUCATION PROGRAMS

PILOT OF PROPOSED NATIONAL ARCHITECTURE

REGIONAL WORKSHOP

NATIONAL PUBLIC WARNING AWARENESS DAY

ANNUAL REPORT ON THE STATE OF PUBLIC WARNING

STAKEHOLDER INPUT, COLLABORATION & CONSENSUS BUILDING

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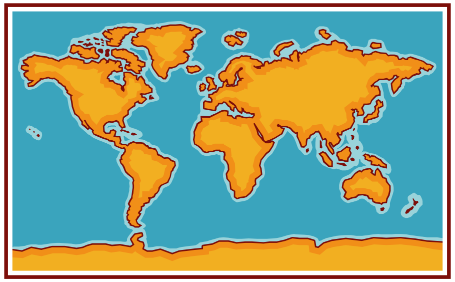
International Activities



- European Union (EU)
  - Investigating Options & Requirements
  - No Mandates or Regulations Issued Yet
- Canada
  - Various Alerting Trial Projects in Progress
    - Opt-In Based Projects
  - No Mandates or Regulations Issued Yet

Mobile Communications Challenges for EAS (1 of 3)

- No “One Size Fits All” Solution For Mobile Networks
- Existing Broadcast EAS Requirement May Not Be Practical for Wireless Mobile Networks
- EAS Requirements For Wireless Mobile Networks Not Yet Defined By Legislation or Regulation Mandates

Mobile Communications Challenges for EAS (2 of 3)

- Incorporating NOAA or FM Radio in Mobile Wireless Handset Not Feasible
  - Battery Life Issue
  - Antenna Issue
  - Issues With Tuning & Monitoring Appropriate Frequencies
  - Adds Too Much Bulk to Handset
  - Requires Replacement of Hundreds of Millions of Handsets

- Short Message Text Services (SMS)
  - May Be Feasible For Small Scale Emergency Notification on Mobile Wireless Handsets
  - Probably Not Practical for Mid to Large Size Metropolitan Areas or National Emergency Notifications
  - Relies on Relatively Scarce Radio Access Network Resources
  - Does Not Support Delivering Messages to Specific Geographic Areas
  - Does Not Support Inbound Roamers
  - Does Not Support Multiple Languages
  - Bogus or False EAS Messages Are Possible

Mobile Communications Challenges for EAS (3 of 3)

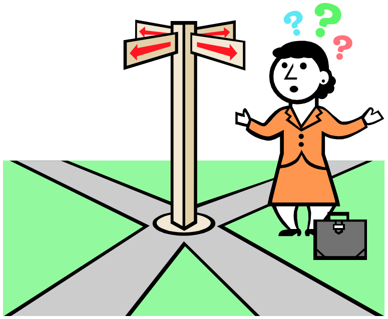
- Mobile Broadcast Technologies May Be Best Solution
  - Could Support Emergency Notification on Mobile Wireless Handsets From Small Local Events to Large Scale Metropolitan or National Events
  - Could Support Delivering EAS Messages to Specific Geographic Areas
  - Could Support Inbound Roamers
  - May Support Multiple Languages

- Mobile Broadcast Technologies Issues
  - Which Mobile Broadcast Technologies?
  - Not Supported By Hundred of Millions Handsets Already Deployed
  - May Not Be Available in Remote & Rural Areas
  - Technologies Not Yet Implemented By Network Operators
  - How Does User or Handset Know When Emergency Alert Being Sent on Mobile Broadcast?

Policy Considerations For EAS Support

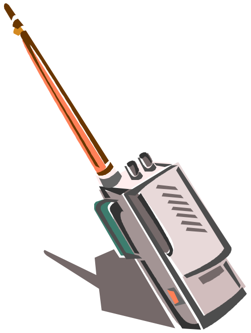
- Consider Immediate Impact of Using Mobile Wireless Handsets for EAS
  - Increased & Perhaps Overwhelming Congestion on Wireless Networks Because Consumers Receive EAS & Response By Making Wireless Calls
- Long Term Solution Requires Replacement of Hundreds of Millions of Wireless Handsets
- Expensive Undertaking for Network Operators
  - Cost Recovery Mechanisms?
- Liability Issues for Network Operators
- Cellular Wireless Communications Just One of Many Tools for EAS Notifications
- Need “Win-Win-Win” Approach For Government, Public, and Industry

Where is EAS Going?



- Future Generations of Wireless Handset Will Probably Support EAS
  - Specific Supporting Technologies To Be Determined
- Support of EAS on Existing Legacy Wireless Handsets Probably Limited
  - Limitations of Current Technology of Existing Handsets
  - Potential for Subscriber Opt-In to Some Text Based Alerting Services
    - CTIA Amber Alert System
    - Washington Amber Alert System
    - Weather Alert Systems

Impact to Amateur Radio



- Currently Undefined
- FCC
  - EAS Moved To Be Under New FCC Public Safety & Homeland Security Bureau
  - Amateur Radio Remains Under Existing FCC Wireless Bureau
- Proposed Senate WARN Act
  - Specifies "Transmission of Alerts Across Greatest Possibilities of Possible Variety of Communications" Including Wireless Communications
  - Implications to Amateur Radio Not Clear

Thank You for Listening

Questions?